

State of Illinois
Department of Registration and Education
State Geological Survey Division
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QUINCY AREA

Adams County
Quincy and Mendon Quadrangles

Guide Leaflet 50-D

by

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Host: Quincy Senior High School

Urbana, Illinois
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ITINERARY

0.0 (0.0) Caravan assembles on east side of Quincy Senior High School. Park headed north of 14th Street.

0.0 (0.0) Start - turning right (E) on Maine Street.

0.9 (0.9) Stop sign (4-way). Turn right (S) on Route 96 (24th Street).

0.3 (1.2) Stop (4-way). Turn left (E) with Route 96, on State St.

1.0 (2.2) Turn right (S) with Route 96.

2.0 (4.2) Continue ahead (S), leaving Route 96 (at Melrose Chapel).

0.2 (4.4) STOP No. 1. On Pleistocene Upland.

On the basis of physiography, the Quincy region may be divided into three general areas: 1) the Mississippi flood plain, 2) the Pleistocene upland plain, 3) and the dissected upland.

The Pleistocene upland developed during the Glacial Period. It is divided by the terminal moraine of the Illinoian glacier, on which we stand, into an Illinoian till plain to the east, and a Kansan till plain to the west. The Kansan till plain can be seen as a slightly lower terrace to the southwest, and also forms the skyline across the river in Missouri.

The Mississippi River trench, here five miles wide, was formed, after Kansan glaciation, at the time of the Illinoian glaciation. It was modified later during the several stages of the Wisconsin glaciation which followed.

The dissection of the Kansan and Illinoian till plains is a direct consequence of the development of the Mississippi River trench. When this was lowered more than 200 feet below the till plain level, the tributary streams set to work rapidly to cut down to the Mississippi River level. The result is the present rough topography made by the innumerable streams and streamlets that cut steep ravines back into the nearly level till plain.

0.0 (4.4) Continue ahead (S).

0.3 (4.7) Hickory Grove School. Continue ahead (S).

1.1 (5.8) Road corners. Continue ahead (S) on rough gravel. Note Kansan till plain surface to west and rising land to east (Illinoian terminal moraine).

1.0 (6.8) Road turns right (w).

0.5 (7.3) Turn left (S) at Lengrove School.

0.6 (7.9) Road descends to valley of Mill Creek.

0.7 (8.6) STOP No. 2. Walk east over foot bridge across Mill Creek.

Where the streams have dissected the till plain surface, they have in many places cut down to and into the bedrock which everywhere lies below the accumulation of glacial drift and later unconsolidated deposits. All of the bedrock layers that are thus exposed in the Quincy Region belong to the Mississippian Period of the Paleozoic Era. The layers are virtually horizontal because they were originally so deposited as sediments in the Mississippian sea and because only very slight movement of the earth's crust has taken place here during the hundreds of millions of years since the sea withdrew.

Mill Creek, cutting laterally to widen its valley here has developed a 40-foot cliff in Mississippian limestone belonging to the Burlington Formation. Some layers of the Burlington are massive and have a high purity; other zones have thinner strata of variable character, including such impurities as clay, chert, and dolomitic (magnesian) content.

Much of the Burlington was originally a lime sand, made up of the broken parts of calcareous shells and especially the joints and plates of crinoids ("sea lilies;" actually animals related to star fish and sea urchins). These fossil remains are common in the old quarry across the bridge.

- 0.0 8.6 Walk north along old road on east bank to sump house.
Because the pure, massive beds of the Burlington are desirable for use in lime manufacture and other special purposes, the rock is often quarried from underground galleries, to prevent a mixture with the undesirable strata that lie above. Such a system of galleries is shown here in the abandoned limestone mine, the underworldly character of which is enhanced by the shallow water which now floods the old workings.
- 0.0 8.6 Continue ahead down valley of Mill Creek.
- 0.5 9.1 Stop. Junction with Route 57. Turn right (N) on No. 57, in MARBLEHEAD.
Note operating lime kilns on left. Stone comes from underground working east of highway and passes in the small cars, under road and up incline into kilns.
Note low ledges of Burlington limestone to right of highway for next mile. Here Mississippi River trench obviously has cut below bedrock level.
- 1.6 10.7 Leave Route 57 and turn right (NE) on gravel road ascending bluff.
- 0.3 11.0 Road turns left (N). For next mile many very deep, wooded ravines cross road. These are cut in thick glacial drift, as the bedrock surface here evidently lies below drainage.
- 1.5 12.5 Bridge over creek, exposing ledges of Burlington limestones. Bedrock surface thus lies higher here than to south.

- 1.7 14.2 Bridge over Curtis Creek.
- 0.7 14.9 Turn left (W) onto Harrison St.
- 1.0 15.9 Stop sign; 12th St. Continue ahead across 12th St., enter park, and turn immediately left (S) to shelter house (0.3 mile SW).
- 0.3 16.2 LUNCH STOP at shelter house in park.
- 0.0 16.2 Circle and return to park exit; turn left just short of park exit and go west down valley in park.
- 0.9 17.1 DANGER. Take left fork to STOP SIGN and jog left across Route No. 57.
Note exposures of Burlington Limestone in Curtis Creek and along north side of road.
- 1.4 18.5 DANGER. Stop sign. Turn right (N) at Gardner-Denver Plant. For next half mile, Burlington Limestone exposed in bluffs to right.
- 0.7 19.2 Caution. Railroad crossing. Note thick loess above Burlington limestone in old quarry across tracks.
- 0.5 19.7 Pleistocene loess on Burlington limestone.
- 0.4 20.1 Road passes under Mississippi River highway bridge.
- 0.3 20.4 Just short of Miss. R. Railroad bridge. Turn left (W) across railroad on inconspicuous blacktop road, and so north along Quincy Bay.
- 0.7 21.1 DANGER. Railroad crossing at mouth of highway underpass. Continue ahead (N) along base of bluffs.
- 0.2 21.3 Caution. R.R. crossing at CARTHAGE JUNCTION.
- 0.5 21.8 Cross Cedar Creek. Bluff ahead shows loess on Burlington limestone.
- 0.1 21.9 Caution. R.R. crossing.
- 0.6 22.5 Caution. R.R. crossing.
- 0.6 23.1 STOP NO. 3. Quarry exposing about 30 feet of Burlington Limestone overlain by 40 feet of loess. At the south end of the loess bank, several feet of Kansan glacial till is exposed.
Because the till is very old and a thin deposit, it has been extensively leached by groundwater action. Of the pebbles, only those most resistant to weathering remain, such as quartzite, quartz, chert, as well as taconite ("iron-formation") and basalt from the Lake Superior Region.
The loess probably accumulated during several Pleistocene epochs, when the Mississippi was a broad, braided stream carrying the floods and outwashed sediments from melting glaciers farther north. From

- 0.6 23.1 (Cont'd) the flats of the braided stream, westerly winds lifted the silt and clay as dust clouds and wafted them eastward to the bluffs and uplands. Today, we find these loess deposits thickest just east of the river; but a continuous blanket lies everywhere beneath the present soil on the Pleistocene uplands.
- 0.0 23.1 Continue ahead (N).
- 0.4 23.5 Caution. R.R. crossing. BAYVIEW.
Jog left and right, and continue north along base of bluff. Note vertical walls of loess in deep cut of side-road to east.
- 1.4 24.9 Cross bridge over Homan Creek.
- 0.2 25.1 Intersection; continue ahead (N) along base of bluffs.
- 0.4 25.5 Rounded bluffs on right are loess.
- 2.4 27.9 Elevator. (check point)
- 0.4 28.3 Caution. R.R. crossing, and bridge over Rock Creek.
- 0.6 28.9 Rock Creek School.
- 1.5 30.4 Cross bridge over Ursa Creek; cliff of Keokuk (upper Burlington) limestone.
- 1.2 31.6 Quarry in Burlington limestone.
- 1.5 33.1 Jog right and left.
- 0.7 33.8 Cross large iron bridge over Bear Creek.
- 0.4 34.2 STOP NO. 4. Bluff at bend of road.
The upper part of the bluff section shows the typical smooth face and vertical jointing characteristic of loess deposits. Below the loess is several feet of red gumbo-till, which lies on red gravel containing many pebbles of glacially transported crystalline rocks, the place of origin of which was the Lake Superior Region.
The loess underlies a terrace lying close to 560 feet or about 80 feet above the present Mississippi. This terrace continues up Bear Creek and is considered as probably of Sangamon age, the long interval of mild climate between the Illinoian and the Wisconsin glacial stages.
- 0.0 34.2 Reverse route.
- 0.6 34.8 Turn left (E) on first road south of Bear Creek.
- 0.4 35.2 Road ascends to 560 foot terrace.
STOP NO. 5. Note flat area of terraces north and south of Bear Creek flood plain. As the Mississippi cut down its flood plain, Bear Creek

- 0.4 35.2 (cont'd.) was able to entrench below its old flood plain level of 560'. This job is only partly completed so far as Bear Creek is concerned, but the glacial torrents that the Mississippi carried have swept the great river clean of terraces from bluff to bluff.
- 0.0 35.2 Continue ahead (E).
- 0.7 35.9 Cross creek in narrow valley below terrace level.
Note that creek has cut down to bedrock.
- 0.7 36.6 DANGER. Stop sign. MARCELLINE. Cross Route No. 96 and continue ahead. (E).
Route for next two miles is over Illinois till plain, with view north over Bear Creek Valley.
- 2.5 39.1 Cross roads. Turn left (N).
- 1.3 40.4 STOP NO. 6. In bottomland woods at base of grade to Grindstone Creek. Walk west to quarry on south side of creek.
The quarry face exposes about 30' of cherty and shaly Warsaw limestone. From the quarry floor to the creek (about 4 feet) the shaly limestone is interbedded with purer fossiliferous limestone, which constitutes a gradation from the Warsaw above to the Keokuk (on upper Burlington) below.
The quarry floor is literally the floor of the ancient Mississippian sea and is covered with the shells of the sea life which lived there hundreds of millions of years ago. Most abundant are brachiopods of several kinds and sections of the stems of crinoids.
The Warsaw formation is everywhere characterized by geodes--roughly rounded masses of chalcedony and quartz which stud the shaly limestone. Many of these geodes are hollow and lined with beautiful crystals of quartz and other minerals. (Best collecting is in creek bed $\frac{1}{2}$ mile above and below quarry; majority of geodes in quarry are solid chalcedony).
The origin of geodes is still a controversial subject, but according to Dr. Percival Robertson of the Principia they formed by the dehydration of silica gel masses, with the outside hardening first as a shell of chalcedony.
- 0.0 40.4 Continue ahead (E) along Grindstone Creek.
- 0.4 40.8 Turn left (N) and cross creek.
- 1.5 42.3 STOP NO. 7. On summit of spur.
The St. Louis limestone, which lies on top of the Warsaw (Warsaw-Salem) formation is exposed as low ledges in the road and the barnyard.
The view south and east is over an old valley remnant without a stream. The rounded contour of the valley walls give it a more mature appearance than is shown by the average active valley today in this

- 1.5 42.3 (cont'd) area. The valley floor is in rock and lies at the same elevation (560') as the terraces at the mouth of Bear Creek. It seems logical to conclude that Bear Creek occupied this valley at the same time that it built the flood plain now represented by the terrace remnants at Stops 4 and 5.

Later the stream or a tributary, working north found part of an ancient, pre-glacial drift-filled valley in the bed rock. Here it was able to cut down more rapidly, so that in time it abandoned the rock-floored valley south of us.

- 0.0 42.3 Continue ahead (N).

- 0.3 42.6 Road turns east. End of conference. Retrace route to Marcelline and Highway No. 96; or south 5 miles to Highway 61 west of Mendon.

Optional Stop.

An excellent exposure of loess and soil under Illinois glacial till can be seen about 4 road miles north where east-west gravel highway crosses North Fork. The section lies north of the road and east of the bridge, below a farmyard.

Sequence of beds is roughly as follows:

1. Thin Peorian Loess grading into oxidized Illinoian glacial till. About 10 ft.
2. Thin gravel and sand layers inter bedded with thicker layers of very fine, non-laminated gray clay. 2 to 3 feet.
3. Silty clay, probably a loess, gray, massive, without pebbles; a thick soil zone with abundant plant remains at top. Possible Loveland (Early Illinoian age). 6 to 7 feet.
4. Fine sand to base of exposure. Several feet.

GENERALIZED GEOLOGIC COLUMN

FOR THE QUINCY AREA

Prepared by the Illinois State Geological Survey

ERAS		PERIODS	EPOCHS	FORMATIONS
Cenozoic "Recent Life"	Age of Mammals	Quaternary	Pleistocene	Recent Post-glacial stage. Wisconsin glacial stage. Sangamon interglacial stage. Illinoian glacial stage. Yarmouth interglacial stage. Kansan glacial stage. Aftonian interglacial stage. Nebraskan glacial stage.
		Tertiary	Pliocene Miocene Oligocene Eocene	Stream gravels.
Mesozoic "Middle Life"	Age of Reptiles	Cretaceous		Present in extreme southern Illinois only.
		Jurassic		Not present in Illinois.
		Triassic		Not present in Illinois
Paleozoic "Ancient Life"	Age of Amphibians and Early Plants	Permian		Not present in Illinois.
		Pennsylvanian		Sandstones, siltstones, shales, clays, and coal beds
		Mississippian	Upper	Not present in Quincy area.
			Lower	St. Louis limestone. Salem-Warsaw limestone & shale. Keokuk-Burlington limestone. Kinderhook shale & limestone.
	Age of Fishes	Devonian		Limestone and shales in deep wells.
	Age of Invertebrates	Silurian		Not present in Quincy area.
		Ordovician		Sandstones, dolomites, and shales in deep wells.
		Cambrian		No data.

Proterozoic

Archeozoic

} Referred to as "Pre-Cambrian" time

GEOLOGICAL HISTORY OF ADAMS COUNTY

The geological story of the Quincy region falls naturally into four great chapters:

1. The formation and beveling of the crystalline basement.
2. The formation of the bedrock layers.
3. The "lost interval" of erosion.
4. The Ice Age history.

1. The crystalline or "granite" basement on which the bedrock layers were laid down comes to the surface in the St. Francis Mountains of Missouri and in the region surrounding Lake Superior. In Illinois only a half dozen wells have penetrated to "the granite," none of them in Adams County.

Some of the basement rocks were once sandstone or shale--others cooled from the molten state as they poured out upon the surface as lava, or deep underground under great pressure. These ancient rock masses then were twisted and shattered in great mountain-making movements that had their roots deep in the earth's crust. Finally, erosion working through an immense span of geologic time, wore the mountain down to a nearly flat plain.

The formation of the basement foundation consumed three-fourths of all geological time, during the two eras (Archaeozoic and Proterozoic) classed together as "Pre-Cambrian."

2. The Cambrian sea was the first to bring preservable times of life to the region, and marks the beginning of a long period of time (the Paleozoic Era) when Illinois was beneath the waters of seas that invaded the continent's interior. It was during this era that the layers of bedrock limestone, shale, and sandstone were laid down as sediment on the bottom of the sea. Late in the Paleozoic Era, during the Pennsylvanian Period, layers of coal were also formed, presumably in great swamps close to sea level. The coal-bearing strata once extended across the Quincy region, but were worn away during the long period of erosion that marks the "lost interval" in Illinois.

3. After the Coal Period, over 200 million years ago, the seas withdrew and there is no evidence that they again covered this part of Illinois. Instead the region was raised a moderate distance above sea level, and streams and weathering agencies set to work to strip away the rocks, layer by layer. The debris of this erosion process was carried off to lower regions to be deposited as new sediments that would some day harden into rock strata. Thus through the days of the dinosaurs and of all the queer and primitive mammals that followed them onto the scene, we have no record of the nature of life here in Illinois. We only know that erosion laid bare the Mississippian limestones and shale that once were buried beneath the coal strata, and that streams cut deep valleys into the bedrock.

4. About a million years ago, climatic conditions permitted the accumulation of great ice masses at the poles and caused them to move as continental glaciers down into our present temperate zone. Climate during the ice age fluctuated so that mild intervals of hundreds of thousands of years in duration intervened between stages of glacial advance.

Thus we can divide the Pleistocene, or Ice Age, according to four major glacial advances, the Nebraskan, Kansan, Illinoian, and Wisconsin glacial stages. Of these only the middle two are known to have crossed the Quincy region as presumably did also the first or Nebraskan Glacier. The last or Wisconsin glaciation did not extend this far southeast, but the waters from its melting seriously effected the Mississippi River which also indirectly contributed the loess that is so vital a factor in the fertility of our uplands.

SUGGESTED REFERENCES

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- Horberg, Leland, "Bedrock Topography of Illinois," Ill. Geol. Surv., Bull. 73.